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November 14, 1995

RECEIVED

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DEPT. OF ECOLOGY

Ms. Lisa Zinner
Department of Ecology
3190 160th Ave., S.E.
Bellevue, Washington 98008-5452

Re: Holnam Inc, Stormwater Containment
Analysis. NPDES Permit No. WA-000223-2

Dear Ms. Zinner:

This letter report has been prepared to satisfy section S4.B of the NPDES Permit listed above for the Holnam, Inc. cement manufacturing plant located at 5400 West Marginal Way Southwest. This report evaluates the site's storm drainage system to determine the size of the storm event that can be accommodated by the existing containment system, and provides a basis for additional hydrologic analysis which will be presented in the Engineering Report (December 1995).

Work Performed

The site was inspected by civil engineers from Focus Engineering and Vasey Engineering. The general layout of the stormwater conveyance facilities was determined from "as-built" drawings (dated 1966) of the system, and generally verified in the field. Catch basin locations were field verified but pipe sizes were not. A topographic survey was conducted to accurately define the drainage divide between basin 4 and basins 1,9 and 10. The volume of the underground stormwater facilities was calculated based on the as-built drawings. Stormwater volumes and peak flowrates were estimated for each basin for several return frequency 24-hour storm events.

Site Location and Description

The Holnam, Inc. Seattle cement manufacturing plant adjoins the Duwamish River Waterway for approximately 2300 feet on the east and north property boundaries. The plant has been in operation since 1967, and has the capacity to produce 490,000 tons of Portland cement annually, using a single wet process rotary kiln. Granular raw materials used in the cement manufacturing process are delivered by truck, rail and barge. The plant is equipped to burn several types of fuel for heat in the manufacturing process. Water required in the process is obtained from the City of Seattle and from recycled stormwater. The Portland cement and by-products are shipped in bag or bulk form by rail, truck and barge.



Stormwater Systems

The entire 20-acre site is paved except for a gravelled non-traffic area just north of the main entry gate, and curbed landscaped areas south and west of the gate. The site has been divided into seven drainage basins (see figure 1). These are defined by pavement slopes and structures which control stormwater runoff movement to existing collection facilities within each basin. Most of the basins have been divided into subareas based on direction of flow. All of the basins except 9 and 10 each have a single discharge point to the Duwamish River. No underground collection facilities are provided within Basin 9. Runoff to the north from basin 9 flows overland off the pavement edge. Runoff from basin 10 is collected and used in the cement manufacturing process. Basins 1, 8 and 10 discharge to the Duwamish River only when runoff exceeds the capacity of the installed systems for recycling the stormwater for use in the manufacturing process. Basins 4, 5 and 6 discharge stormwater from all events directly to the Duwamish River. Basins and discharge points (outfalls) are shown on Figure 1. Outfall 7 discharges runoff from the Chemithon plant south of the site and receives no runoff from the Holnam site.

Hydrologic Analysis

Peak flowrates and runoff volumes have been calculated for 24-hour duration storm events with return frequencies of 2, 5, 10, 25, 50 and 100 years. In addition, the peak flowrate and runoff volume from a 6-month storm event was calculated. As defined in the Department of Ecology's Stormwater Management Manual for the Puget Sound Basin, the 6-month storm event is taken to have a precipitation of 64 percent of the 2 year 24-hour precipitation. The calculations were conducted using the Santa Barbara Urban Hydrograph Method. Most of the site is impervious (95 percent), pavement or roof. A small portion is gravel or grass. The runoff curve number for the impervious area is 98 and for the gravel and grass is 85. Total precipitation for the 24-hour storm events were taken from the King County Surface Water Design Manual and are presented in Table 1 below.

Table 1.

6 mo. (in.)	2 yr. (in.)	5 yr. (in.)	10 yr. (in.)	25 yr. (in.)	50 yr. (in.)	100 yr. (in.)
1.34	2.1	2.5	2.9	3.4	3.7	4.2

The calculation results are presented in Table 2. Flow charts and calculation spreadsheets for each drainage basin and outfall are presented in the Appendix.

Table 2.

Outfall No.	1	2	3	4	5	6	7	8	9	10
Area (ac)	3.48			3.62	0.53	0.34		9.15	0.84	0.80
Peak flow (cfs)										
6 mo	0.82			0.92	0.21	0.14		2.51	0.33	0.21
2 yr	1.39			1.56	0.35	0.22		4.24	0.54	0.37
5 yr	1.73			1.87	0.42	0.27		5.30	0.65	0.45
10 yr	2.10			2.22	0.49	0.31		6.18	0.76	0.54
25 yr	2.52			2.67	0.58	0.37		7.90	0.89	0.64
50 yr	2.78			2.96	0.63	0.40		8.16	0.97	0.70
100 yr	3.21			3.40	0.72	0.46		9.46	1.08	0.81
Runoff volume (cu.ft)										
6 mo	12,402			14,568	2,160	1,385		37,086	3,424	3254
2 yr	21,396			24,990	3,604	2,312		62,723	5,714	5435
5 yr	25,782			29,676	4,368	2,802		75,330	6,925	6589
10 yr	31,014			35,208	5,134	3,293		88,349	8,139	7746
25 yr	36,924			41,592	6,092	3,908		110,658	9,658	9193
50 yr	40,902			45,438	6,668	4,277		120,402	10,571	10061
100 yr	47,058			51,762	7,627	4,770		132,030	11,788	11511

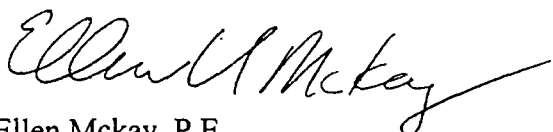
Basins 4, 5, and 6 discharge via uncontrolled outfalls directly to the Duwamish. Basin 9 discharges off the north edge of the site directly to the Duwamish. The total runoff volume from the 10-year storm from these basins taken from table 2 is 47,594 cubic feet. Basins 1, 8 and 10 are equipped with pumps that recycle storm water in the process. The capacity of the pumps in basins 1, 8 and 10 is 0.18, 0.89, and 0.18 cfs respectively.

Table 2 indicates that the peak flows for all return frequency storm events are higher than the pumping capacity of the recycling pumps. However, if adequate storage capacity is assumed in the underground facilities, the pump flow can be subtracted from the total runoff volume. The pumping volume over 24 hours for basins 1, 8 and 10 is 15,552, 96,896, and 15,552 cubic feet respectively. Subtracting this from 10-year return frequency runoff volumes listed in table 2 results in 15,462, 0 and 0 cubic feet of runoff for basins 1, 8, and 10 respectively.

The engineering report will include an analysis of plant operations in order to determine opportunities and constraints for accepting additional recycled stormwater. Alternatives for containing and treating stormwater from basins 4, 5 and 6 will be evaluated in this engineering report.

Sincerely,

FOCUS ENGINEERING



Ellen McKay, P.E.
President

Sincerely,

VASEY ENGINEERING



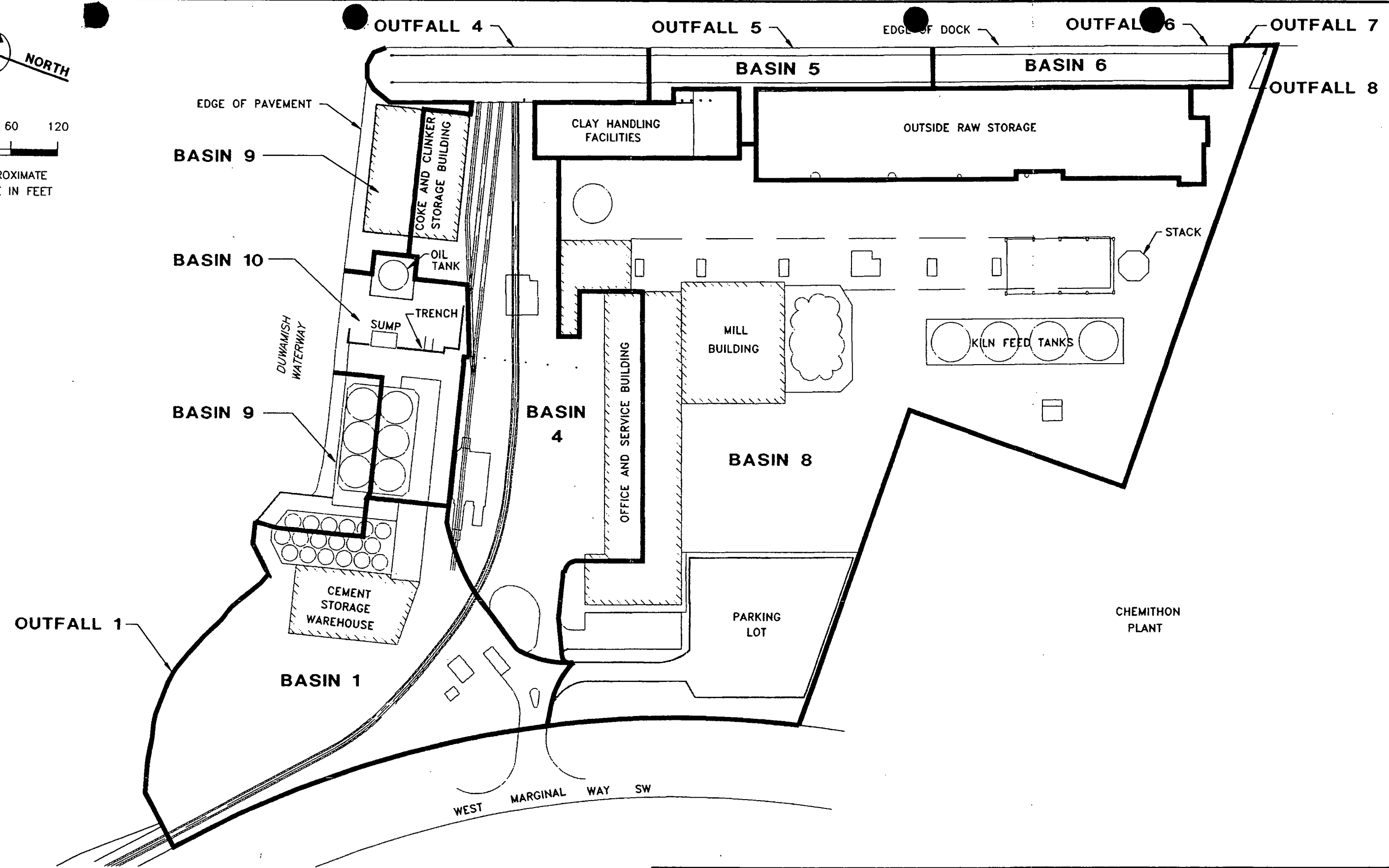
Bard Horton, P.E.
Senior Engineer

cc. Conrad Szymiczak, Holnam





APPROXIMATE
SCALE IN FEET



Prepared by:



vasey engineering



FOCUS
ENGINEERING, INC

HOLNAM INC

SITE BASIN PLAN

Figure

1:1 954501\Focus-04.DWG XREFS: Base.DWG 11/95 11X17